specification as filed to make it consistent with the cancellation of independent claim 1, the amendments made herein to independent claims 2, 6 and 9 and to delete therefrom the summaries of non-elected independent claims 12, 15, 19, 22, 23, 25 and 33. Applicant has amended the Title as filed to that suggested by the Examiner in the Office Action.

Applicant has amended each of independent claims 2, 6 and 9 to recite therein that the mixed gas stream, which is the combination of three streams, is formed internal to the nozzle. This amendment to independent claims 2, 6 and 9 does not introduce new matter as the specification as filed describes the three gas streams in the paragraph that starts at line 13 on page 13 and then says at line 21 on that page that the three streams are mixed in mixing chamber 74 which as is shown in Figs. 2 and 4 as filed is internal to the nozzle.

Applicant has amended Fig. 2 as filed to add the missing reference numeral 90 to that figure. The solid wall 90 is also shown in Fig. 4.

The Objection to the Drawings

The Examiner has objected to Fig. 2 of the drawings as filed because reference numeral "90" which is mentioned in the description of that figure in the specification as filed is missing from that figure. Applicant has amended Fig. 1 as shown in red in the duplicate copies of that figure attached hereto to add "90" thereto. In view of this amendment, applicant hereby requests reconsideration of the objection to the drawings.

The Objection to the Specification

The Examiner has said that the title as filed is not descriptive and suggested a new title which applicant has adopted. Therefore, reconsideration of this objection is requested.

The Rejections of the Claims

The Examiner has rejected claims 1-11 and 34-37 under 35 U.S.C. 102(a) as anticipated by or in the alternative under 35

U.S.C. 103(a) as obvious over U.S. Patent No. 6,207,020 (Anderson). In support of this rejection the Examiner says that Anderson teaches a method of wetting a web using a nozzle that has three liquid/gas feeds and refers to Figs. 2-5 of Anderson.

Anderson in Figs. 1-4 shows various embodiments for his nozzle. Fig. 5 is an enlargement of a portion of Fig. 4. In none of these embodiments is there internal to the nozzle a mixed gas stream that is the combination of the three streams called for in each of independent claims 2, 6 and 9 as amended herein.

In each of Figs. 1-4 of Anderson, the flows emanating radially outwardly from the nozzle are indicated by 26, 26′ 26″ and 26′″, respectively. It is the shape of the head 16 in conjunction with its spacing, dimensions and arrangement relative to open end 22 of sleeve 12 then creates the turbulent flow regime shown in Fig. 1 (see column 5, lines 46-49). This is also true for the embodiments shown in Figs. 2-4 where the head is designated as 16′, 16″ and 16′″, respectively. Thus there is not internal to any of the nozzles shown in Anderson the mixed gas stream called for by applicant in his amended independent claims 2, 6 and 9. Further there is nothing in Anderson that teaches, discloses or even suggests such a mixed gas stream internal to the nozzle.

Therefore, reconsideration of the rejection of all of the claims, except for claim 1 which has been cancelled herein without prejudice, as either anticipated or obvious based on Anderson is requested.

Reconsideration of the application in accordance with Rules 111 and 112 is requested.

*****Signature and Certificate of Mailing Appear On The Following Page*****

Respectfully submitted,

Date: 5/20/03

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I hereby certify that this correspondence is being deposited with the United States Postal Service as first class mail in an envelope addressed to:

Commissioner For Patents
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Alexandria, VA 22313-1450

on the 20th day of May, 2003.

Respectfully, Debra A. Rietze

Date May 20, 2003

In re Application of: Shizhong Duan

Ser. No. 10/001,408 Group Art Unit: 1731

Filed: October 22, 2001 Examiner: Jose A. Fortuna

Assignee: ABB Inc.

For: Spraying Nozzle For Rewet Showers

Docket No. E20010170

ATTACHMENT TO NON-FEE AMENDMENT UNDER RULE 111 DATED MAY 20, 2003

This attachment includes the marked amendments to the Specification as follows:

a) the Title as filed

[Spraying Nozzle For Rewet Showers] Method Of Wetting Webs Of Paper Or Other Hygroscopic Material

b) the Summary of the Invention as filed

[A method of wetting webs of paper or other hygroscopic material. The method comprises the steps of:

(a) forming a mixed gas stream that is the combination of a gas stream that has a swirling movement about a predetermined axis, one gas stream moving straight in the direction of the axis in the inner portion of the swirling stream and another gas stream also moving straight in the direction of the axis the another gas stream wrapping around the swirling stream and the one straight gas stream;

(b) supplying a flow of liquid into the formed gas stream so that the flow of liquid is atomized by the formed gas stream; and

(c) advancing a web of hygroscopic material across the atomized liquid flow.]

A method of wetting webs of paper or other hygroscopic material using an atomizing nozzle. The method comprises [the

steps of]:

(a) forming internal to [in] the nozzle a mixed gas stream that is the combination of a gas stream that has a swirling movement about a predetermined axis, one gas stream moving straight in the direction of the axis in the inner portion of the swirling stream and another gas stream also moving straight in the direction of the axis the another gas stream wrapping around the swirling stream and the one straight gas stream;

(b) supplying a flow of liquid into the formed gas stream so that the flow of liquid is atomized by the formed gas stream; and

(c) advancing a web of hygroscopic material across the atomized liquid flow.

A method of wetting webs of paper or other hygroscopic material. The method comprises [the steps of]:

(a) arranging at least first and second atomizing nozzles in an array wherein the at least first and second nozzles are adjacent to each other;

(b) forming internal to [in] each of the at least first and second nozzles a mixed gas stream that is the combination of a gas stream that has a swirling movement about a predetermined axis, one gas stream moving straight in the direction of the axis in the inner portion of the swirling stream and another gas stream also moving straight in the direction of the axis the another gas stream wrapping around the swirling stream and the one straight gas stream;

(c) supplying a flow of liquid into the formed gas stream so that the flow of liquid is atomized by the formed gas stream; and

(d) advancing a web of hygroscopic material across the atomized liquid flow.

A method of wetting webs of paper or other hygroscopic material using an atomizing nozzle. The method comprises [the

steps of]:

(a) creating an array of the atomizing nozzles;

(b) forming internal to [in] each of the nozzles a mixed gas stream that is the combination of a gas stream that has a swirling movement about a predetermined axis, one gas stream moving straight in the direction of the axis in the inner portion of the swirling stream and another gas stream also moving straight in the direction of the axis the another gas stream wrapping around the swirling stream and the one straight gas stream;

(c) supplying a flow of liquid into the formed gas stream so that the flow of liquid is atomized by the formed gas stream; and

(d) advancing a web of hygroscopic material across the atomized liquid flow.

[An apparatus for atomizing a liquid with a gas. The apparatus comprises:

a) a housing having a gas discharging outlet and a liquid discharging outlet aligned flush with each other;

b) a first nozzle in the housing for producing at the gas discharging outlet and along a predetermined axis a mixed gas stream that is the combination of a gas stream that has a swirling movement around the predetermined axis, a first gas stream moving straight in the direction of the axis in the inner portion of the swirling stream and a second gas stream also moving straight in the direction of the axis and wrapping around the swirling stream and the first gas stream;

c) a second nozzle disposed in the first nozzle for producing at the liquid discharging outlet a controlled stream of liquid; and

d) a gas stream divider disposed in the first nozzle

and outside of the second nozzle, the gas stream divider maintaining the concentricity of the mixed gas stream and the controlled liquid stream.

An apparatus for atomizing a liquid with a gas. The apparatus comprises:

a) a first nozzle for producing in the apparatus and along a predetermined axis a mixed gas stream that is the combination of a gas stream that has a swirling movement around the predetermined axis, a first gas stream moving straight in the direction of the axis in the inner portion of the swirling stream and a second gas stream also moving straight in the direction of the axis and wrapping around the swirling stream and the first gas stream;

b) a second nozzle disposed in the first nozzle for producing in the apparatus a controlled stream of liquid; and

c) a gas stream divider disposed in the first nozzle and outside of the second nozzle, the gas stream divider maintaining the concentricity of the mixed gas stream and the controlled liquid stream.

In a nozzle, a method for atomizing a liquid with a gas. The method comprises the steps of:

(a) forming a mixed gas stream that is the combination of a gas stream that has a swirling movement about a predetermined axis, one gas stream moving straight in the direction of the axis in the inner portion of the swirling stream and another gas stream also moving straight in the direction of the axis the another gas stream wrapping around the swirling stream and the one straight gas stream; and

(b) supplying a flow of liquid into the formed gas stream so that the flow of liquid is atomized by the mixed gas stream.

A method for atomizing a liquid with a gas. The method

comprises the steps of:

(a) forming a mixed gas stream that is the combination of a gas stream that has a swirling movement about a predetermined axis, one gas stream moving straight in the direction of the axis in the inner portion of the swirling stream and another gas stream also moving straight in the direction of the axis the another gas stream wrapping around the swirling stream and the one straight gas stream;

(b) atomizing a flow of liquid with the formed gas stream to produce fine droplets of the liquid; and

(c) adjusting at least one of the swirling gas stream, the one gas stream and the another gas stream in the mixed gas stream so that the droplets have a predetermined mass distribution profile.

In a nozzle for atomizing a liquid with a gas, the nozzle having an outlet. The nozzle comprises:

(a) a gas stream divider for dividing a gas stream entering the nozzle into a swirling gas stream that has a swirling movement about a predetermined axis, one gas stream moving straight in the direction of the axis in the inner portion of the swirling stream and another gas stream also moving straight in the direction of the axis; and

(b) a chamber for mixing the swirling stream, the one straight stream and the another straight stream to produce in the nozzle a mixed gas stream that is the combination of the swirling stream, the one straight gas stream and the another straight gas stream, the another straight gas stream wrapping around the swirling stream and the one straight gas stream.

An apparatus comprising:

an array of nozzles for atomizing a liquid with a gas, each of the nozzles having an outlet and each of the nozzles comprising:

(i) a gas stream divider for dividing a gas stream entering the nozzle into a gas stream that has a swirling movement about a predetermined axis, one gas stream moving straight in the direction of the axis in the inner portion of the swirling stream and another gas stream also moving straight in the direction of the axis; and

(ii) a chamber for mixing the swirling stream, the one straight stream and the another straight stream to produce in the nozzle a mixed gas stream that is the combination of the swirling stream, the one straight gas stream and the another straight gas stream, the another straight gas stream wrapping around the swirling stream and the one straight gas stream.

An apparatus comprising:

an array of nozzles for atomizing a liquid with a gas, each of the nozzles having an outlet and each of the nozzles comprising:

(i) a gas stream divider for dividing a gas stream entering the nozzle into a gas stream that has a swirling movement about a predetermined axis, one gas stream moving straight in the direction of the axis in the inner portion of the swirling stream and another gas stream also moving straight in the direction of the axis;

(ii) a chamber for mixing the swirling stream, the one straight stream and the another straight stream to produce in the nozzle a mixed gas stream that is the combination of the swirling stream, the one straight gas stream and the another straight gas stream, the another straight gas stream wrapping around the swirling stream and the one straight gas stream; and

(iii) a flow of liquid atomized by the mixed gas stream; and a web of a hygroscopic material advancing across the array of nozzles.]

This attachment also includes the amendment to claims 2, 6, 9 and 34-37 as follows:

2. (Amended) A method of wetting webs of paper or other hygroscopic material using an atomizing nozzle, comprising [the steps of]:

(a) forming internal to [in] said nozzle a mixed gas stream that is the combination of a gas stream that has a swirling movement about a predetermined axis, one gas stream moving straight in the direction of said axis in the inner portion of the said swirling stream and another gas stream also moving straight in the direction of said axis said another gas stream wrapping around said swirling stream and said one straight gas stream;

(b) supplying a flow of liquid into said formed gas stream so that the flow of liquid is atomized by said formed gas stream; and

(c) advancing a web of hygroscopic material across the atomized liquid flow.

6. (Amended) A method of wetting webs of paper or other hygroscopic material, comprising [the steps of]:

(a) arranging at least first and second atomizing nozzles in an array wherein said at least first and second nozzles are adjacent to each other;

(b) forming internal to [in] each of said at least first and second nozzles a mixed gas stream that is the combination of a gas stream that has a swirling movement about a predetermined axis, one gas stream moving straight in the direction of said axis in the inner portion of the said swirling stream and another gas stream also moving straight in the direction of said axis said another gas stream wrapping around said swirling stream and said one straight gas stream;

(c) supplying a flow of liquid into said formed gas stream so that the flow of liquid is atomized by said formed gas stream; and

(d) advancing a web of hygroscopic material across the

atomized liquid flow.

9. (Amended) A method of wetting webs of paper or other hygroscopic material using an atomizing nozzle, comprising [the steps of]:

(a) creating an array of said atomizing nozzles;

(b) forming internal to [in] each of said nozzles a mixed gas stream that is the combination of a gas stream that has a swirling movement about a predetermined axis, one gas stream moving straight in the direction of said axis in the inner portion of the said swirling stream and another gas stream also moving straight in the direction of said axis said another gas stream wrapping around said swirling stream and said one straight gas stream;

(c) supplying a flow of liquid into said formed gas stream so that the flow of liquid is atomized by said formed gas stream; and

(d) advancing a web of hygroscopic material across the atomized liquid flow.

34. (Amended) The method of Claim 2 further comprising [the step of] adjusting at least one of said swirling gas stream, said one gas stream and said another gas stream in said mixed gas stream so that said atomized liquid flow has a predetermined mass distribution profile.

35. (Amended) The method of Claim 2 wherein said atomizing nozzle is one nozzle in an array of said atomizing nozzles and said method further comprises [the step of] adjusting in each of said atomizing nozzles in said array at least one of said swirling gas stream, said one gas stream and said another gas stream in said mixed gas stream so that said atomized liquid flow from each of said atomizing nozzles has a predetermined mass distribution profile.

36. (Amended) The method of Claim 6 further comprising [the step of] adjusting in at least one of said first and second atomizing nozzles at least one of said swirling gas stream, said

one gas stream and said another gas stream in said mixed gas stream so that said atomized liquid flow has a predetermined mass distribution profile.

37. (Amended) The method of Claim 9 further comprising [the step of] adjusting in at least one of said atomizing nozzles in said array at least one of said swirling gas stream, said one gas stream and said another gas stream in said mixed gas stream so that said atomized liquid flow has a predetermined mass distribution profile.